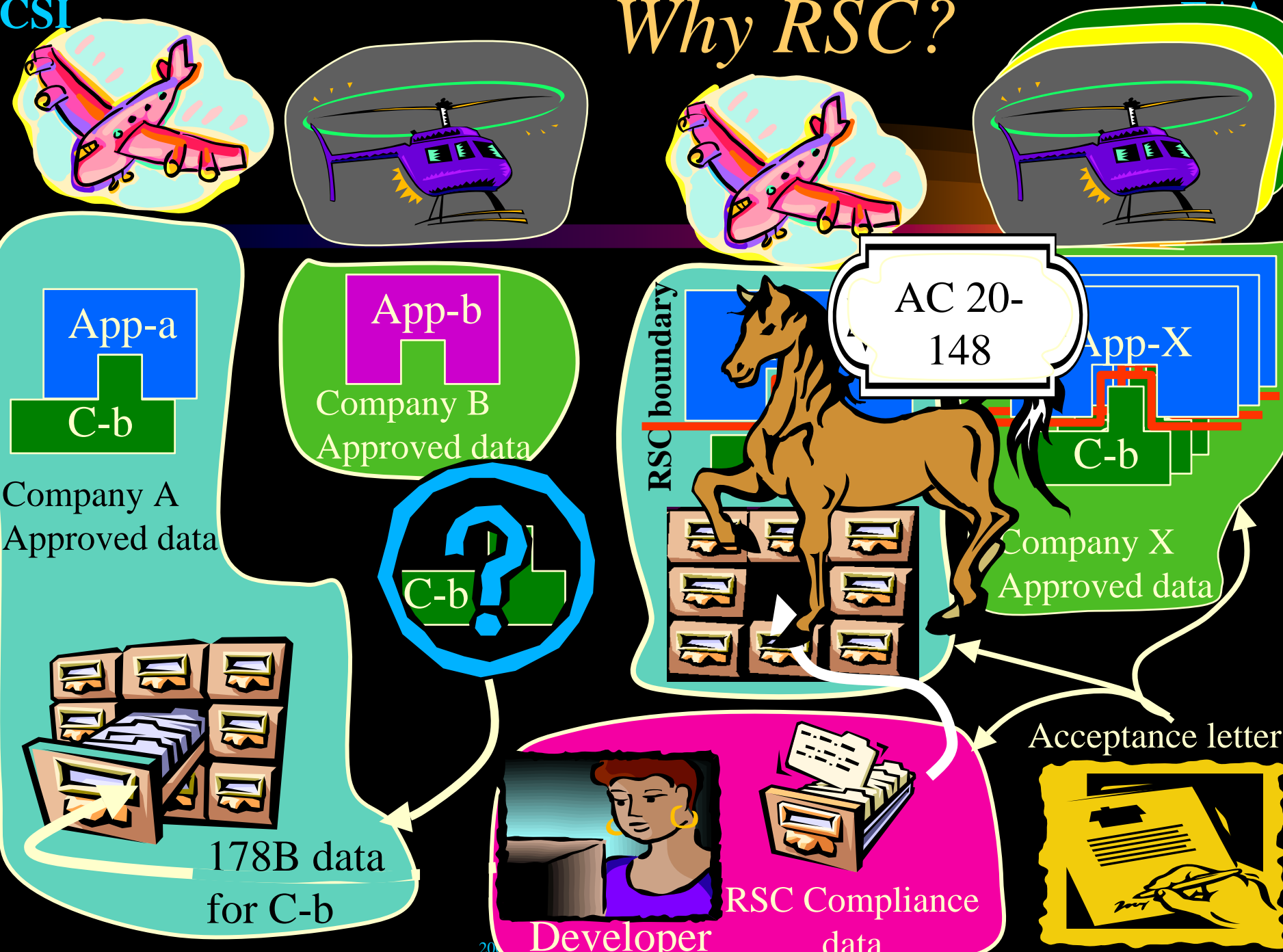# Reusable Software Component (RSC) reality show

Reusable SW components (RSC) in real life

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Regulatory perspective

- Anatomy of AC 20-148

- Regulatory benefits

- When is RSC a bad idea?

- Problems

- Regulatory case study

Anatomy of AC 20-148

- Roles and responsibilities
  - Developer, integrator/applicant (2), regulator
- Credit
- Data deliverables
  - DO-178B data (RSC modified)
  - Data sheet (added)
- Changes
- Acceptance letter

Regulatory benefits and burdens

- + Reduced certification effort on follow-on certifications

- - Higher effort on initial certification
  - Coordination
  - Additional review/analysis at developer
  - Additional overhead associated with integrator/applicant on initial certification
  - RSC change issues

Regulatory benefits and burdens, cont.

- - Increased communication

- - Post-certification issues

- - Document retention

- - Problem feedback

- - Greater effort in tracking compliance

When is RSC a bad idea?

- No clearly defined functionality
- Excessive customization required (say, 40% changes for each installation)
- Decision for RSC near end of project
- No support from applicant
- Few potential instantiations of RSC component
- Large number of interface parameters

When is RSC a good idea?

- Algorithmic components

- Small number of interfaces

- Little or no tie to physical I/O

- Certain tools

Case study, block diagram
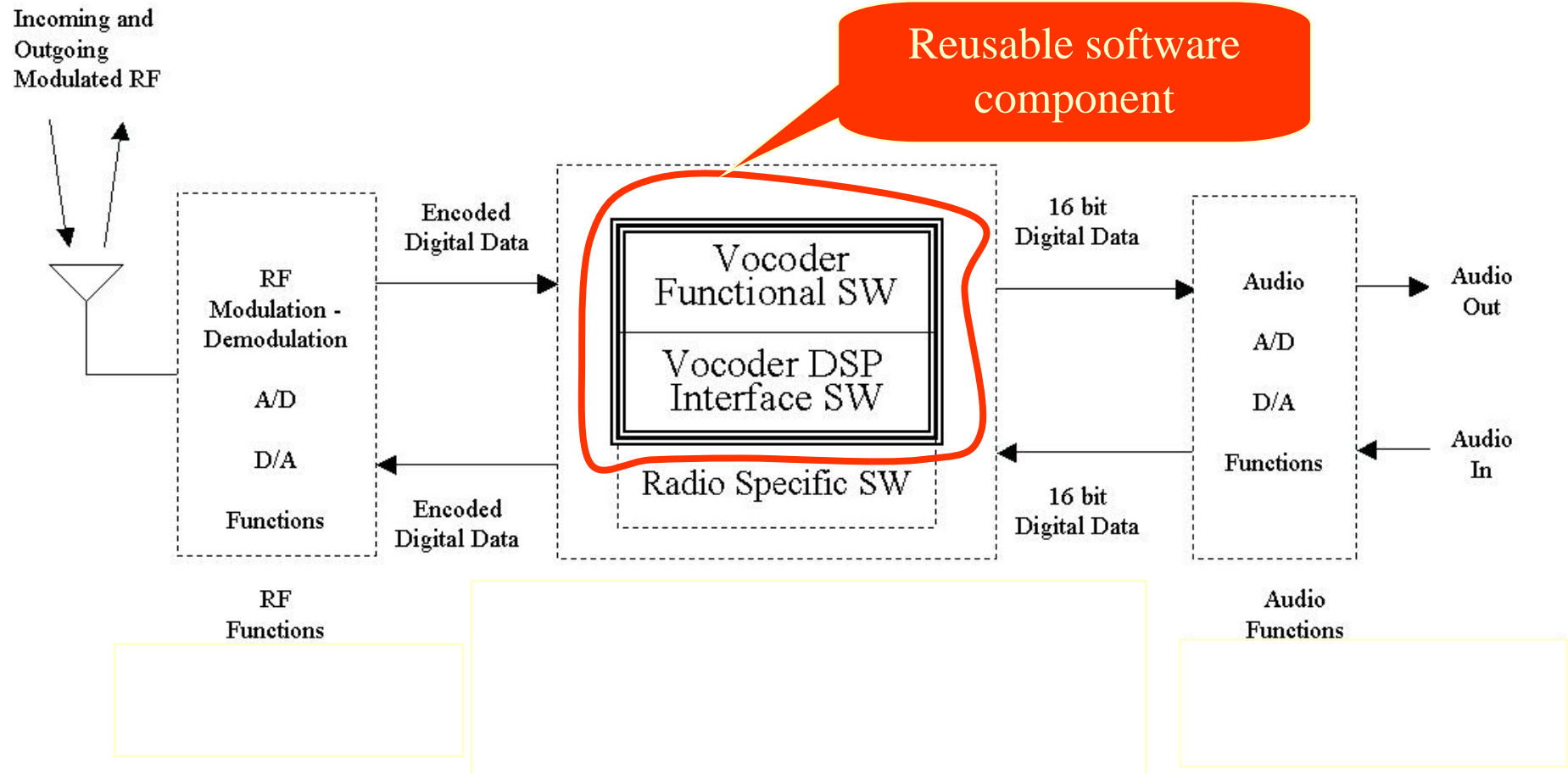
Case study study

- Vocoder algorithm for NEXCOM
  - TSO'd system supported by three geographically dispersed manufacturers
  - Bruce Siebenthall sponsored effort at FAA
  - Required multiple meetings among developers, manufacturers, FAA procurement, FAA certification offices
  - Agreement on SACO as lead ACO and ACO approval delegations
  - Project started last half 2002, RSC acceptance letter issued 2 Feb 2005

Developer's perspective - vocoder

- Is it worth it?

- Creating a partnership

- Importance of regulatory liaison

- Compliance tools

Is it worth it?

- Effort to support certification more than expected

- All data must be evaluated for potential future customer impact

- Cost = f(complexity of interface, credit claimed, coordination required)

- Limited credit; other choices may be more economically viable

Creating a partnership

- Early notification of RSC intent

- Identification of all stakeholders

- Apportioning of tasks

- Brokering certification authority agreements

- Ensuring real-time coordination between all stakeholders

Issues

- Configuration management
- Notification of problems to users
  - Customer tracking
  - Safety impact
- Archiving and escrowing of data
- Deliverables and intellectual property
- PSAC – larger and slower to get approved

Issues, cont.

- Draft guidance
  - Complicated by RSC vs traditional; potential for rendering RSC approval useless

- COTS vendor

- Vocoder unique
  - Requirements definition and testing

Advantage of RSC for internal data

- Order 8110.49 provides means of reusing internal data
  - Valid only for own TSO data
  - Not useable for transferring between applicants
- AC 20-148 provides means for encapsulating approval with data
  - Transfer of objective compliance between multiple applicants
- Use of TSO host

Compliance tools

AC ref.	AC-148 RSC Guideline	Compliance Data
5. GUIDELINES FOR THE RSC DEVELOPER		
5-a	Produce a PSAC for the RSC as early as possible in the project. The RSC PSAC must	
5-a.(1)	Include the information in Section 11.1 of RTCA/DO-178B	
5-a(2)	Detail the RSC developer's plans for satisfying each applicable RTCA/DO-178B objective;	
5-a.(3)	Identify which objectives the RSC developer will not satisfy, and which objectives they will partially satisfy;	
. . .	. . .	

Compliance tools

- Objective credit assessment matrix

- AC 20-148 compliance matrix

- Fill-in forms – send message to
  cathy.vierthaler@certification.com
  with "20-148 forms" in the Subject line

Questions???

Coordination

& more coordination